MODUL HANDBOOK

Module Name	Natural Product Chemistry
Module level	Bachelor
Abbreviation, if applicable	-
Sub-heading, if applicable	-
Course included in the module, if applicable	-
Semester/term	5th/First Year
Module coordinator(s)	Prof. Dr. Tukiran, M.Si.
Lecturer(s)	Prof. Dr. Tukiran, M.Si., Prof. Dr. Suyatno, M.Si., Dr. Ratih Dewi Saputri, M.Si
Language	Indonesian
Classification within the curriculum	Compulsory Course
Teaching format/class hours per week during the semester	2 hours lecturers (50 min per hours)
Workload	Total workload 128 hours per semester which consists of 2 hours for lecture, 3 hours for structured activities, 3 hours for individual activities, and 16 weeks per a semester (3.18 ECTS)
Credit points	2 SCU
Prerequisites course(s)	-
Targeted learning outcomes	CLO 1 Students can use the concept of secondary metabolite compounds to screen, isolate, and test the bioactivity of secondary metabolites CLO 2 Students can describe the basic principles of formation reactions and biosynthetic pathways for secondary metabolites. CLO 3 students can master the basic concepts of secondary metabolites and their benefits for humans. CLO 4 Students can make decisions based on the results of screening, isolation, and bioactivity tests of secondary metabolites. CLO 5 Students Have a responsible attitude in developing extracts or isolates as herbal medicinal ingredients.
Content	1. Classification and benefits of secondary metabolite compounds. 2. Explanation of various types of extracts that traditional and modern industries can utilize. 3. Indonesian medicinal plant bioactive compounds and their uses. 4. Data collection of plant bioactive compounds 5. Can use the explain of traditional medicine of traditional medicine. 6. Terpenoids, classification, biosynthesis, and distribution in plants. 7. Steroids, classification, biosynthesis, and distribution in plants.

	8. Phenylpropanoids, classification, biosynthesis, and distribution in plants. 9. Polyketides, classification, biosynthesis, and distribution in plants. 10. Flavonoids, classification, biosynthesis, and distribution in plants. 11. Alkaloids, classification, biosynthesis, and distribution in plants. 12. Isolation methods/techniques. 13. Identify isolated compounds through chemical tests. 14. Explain the results of the study of the journal of natural materials chemistry. 15. Present work visits in groups from traditional medicine (herbal) industry, natural ingredients industry, and pharmaceutical industry.
Study/exam achievements	Students are considered to be competent and pass if at least get 55. Final score is calculated as follows: 10% participation + 20% assignment + 30% middle exam (UTS) & 40% final exam (UAS). Table index of graduation • A = 4 (85 ≤-≥ 100) • A- = 3,75 (80 ≤-< 85) • B+ = 3,5 (75 ≤- < 80) • B = 3 (70 ≤-< 75) • B- = 2,75 (65 ≤-<75) • C+ = 2,5 (60 ≤-<65) • C = 2 (55 ≤-<60) • D = 1 (40 ≤-<55) • E = 0 (0 ≤-<40)
Media	Computer, LCD, White board, presentation, and book
Learning Methods	Individual assignment, group assignment, discussion, Presentation.
Literature	1. Achmad, S.A., Hakim, E.H., Makmur, L., Syah, Y.M, Juliawati, L.D., dan Mujahidin, D., 2007, Tumbuhan-tumbuhan Obat Indonesia, ITB Press, Bandung. 2. Andersen, O.M., and Markham, O.M., 2006, Flavonoid: Chemistry, Biochemistry and Aplications , CRC Press, Taylor and Francis Group. 3. Cordell, G.A., 2002., The Alkaloid: Chemistry and Pharmacology, Academic Press Inc. 4. Dewick, P.M., 2009. Medicinal Natural Product: A Biosynthetic Approach, 3rd Ed., John Willey & Sons, Inggris. 5. Harborne, J.B. 1987. *Metode Fitokimia*. Penterjemah: Kosasih P. Bandung : Penerbit ITB. 6. Tukiran. 2015. Kimia Bahan Alam: Berbasis Field Study dan Pendekatan Chemo-Enterprenuership, Surabaya: Penerbit Unesa University Press. 7. Vermerris, W., and Nicholson, R., 2006, Phenolic Compound Biochemistry, Springer. 8. Journal related to Natural Product Chemistry.
Note	Practicum of Organic Chemistry covers the activities of theory, discussion, practicum and presentation. Total ECTS = ((total hours workload x 50 min)/60 min)/25 hours. Each ECTS is equals wits 25 hours.